Herd Reduction

Background.

Very high prevalence (50-90%) of CWD in some captive facilities suggests that transmission of CWD may be positively density dependent; questions, however, remain about the mechanism of CWD transmission. Research is currently being conducted in Colorado to test the relationship between population density and CWD prevalence. Host population reduction has been frequently used to control diseases in wildlife as discussed in the Background section. Population reduction is based on the premise that infectious disease is a density-dependent process. Host population density is one factor affecting the rate of transmission of contagious diseases. Population reductions, in advance of spreading disease, have been used successfully to limit the spread of rabies in foxes, skunks, and vampire bats (Wobeser 1994). Dispersing deer are a likely avenue for the spread of CWD across landscapes (see the Background section for a review of deer dispersal).

In addition to posing a risk of disease spread, dispersing deer may also affect the effectiveness of efforts to depopulate deer in the affected area. Immigration from surrounding uncontrolled regions is a frequently cited problem in disease control depopulation programs (MacDonald and Voigt 1985, Freeland and Boulton 1990). Ingress from surrounding areas was an important factor limiting the effectiveness of a removal program for feral water buffalo in Australia to control bovine tuberculosis (Ridpath and Waithman 1988).

An example of an area where population reduction is being implemented to control the spread of disease is the current CWD Management Zone in southwestern Wisconsin, created by the DNR's emergency rule in 2002. The CWD Management Zone was centered on the known positive CWD cases and extended outward approximately 40 miles. The CWD Management Zone did not include the CWD IHZ that immediately surrounds the EZ. The CWD Management Zone included all of deer management units 70, 70A, 70B, 70E, 73E, 75A, 75C, 75D, 76, 76M except for those parts of 70, 70A, 75A, 75C, 76, and 76M that were included in the IHZ (Figure 3 in Backgroundsection). The CWD Management Zone also includes parts split off of five deer management units: 54B, 70G, 71, 73B, and 77A. Boundaries of the CWD Management Zone were numbered or lettered federal, state, or county highways. The emergency rule reduced the overwinter goal for units in the CWD Management Zone to 10 deer per square mile of deer habitat. The 2002 emergency rule extended the dates of the archery and gun seasons in the CWD Management Zone and specified the issuance of an unlimited number of earn-a-buck permits in 2002 to reduce populations quickly to the lower goal level.

Hunting seasons have been the primary tool of deer herd management throughout Wisconsin's history (Wisconsin DNR 2001). Typically, over 700,000 hunters pursue deer each year in this state. In the past, hunters have had the capability of controlling the deer herd at or near population goals established for each management unit. Traditionally, hunting seasons and antlerless deer permit systems had been conservative to protect deer populations and allow them to grow to levels consistent with habitat carrying capacity and human tolerance. Recently, however, hunting harvests have not kept pace with herd growth, and deer herds have not been kept at overwinter population goals (R. Rolley, pers. comm.). Hunters have been reluctant to support liberalizing hunting seasons and permit systems as they enjoy seeing the higher numbers of deer. Yet, October and December four-day antlerless only seasons (Zone T) with free antlerless deer permits have been employed to increase harvest of deer in units where normal hunting seasons and permit systems are not expected to get deer populations to within 20% of overwinter goals. The Deer 2000 citizen participation process also developed an earn-a-buck regulation. Earn-a-buck will be used when two years of Zone T have not reduced the population to within 20% of deer management unit population goals (Wisconsin Conservation Congress 2001). Unfortunately, even these liberal regulations are not expected to be enough to get hunting harvests to the levels needed to control CWD. Therefore, even more liberal seasons and regulations have been proposed.

Herd Reduction Program.

Proposed Action.

The proposed rule would grant the DNR authority to establish a herd reduction zone (HRZ) by rule around areas where CWD positive animals have been identified in free ranging cervids. Units or portions of units located within the boundaries of a HRZ would be managed for an overwinter population goal of 10 deer per mi^2 of deer habitat. A HRZ shall be bounded by readily identifiable features of the landscape such as roads and rivers. The intent of creating this zone is to establish a buffer zone of low deer density around the area where CWD has been identified in an effort to slow or prevent the spread into unaffected areas. In addition, intensive surveillance would be conducted in a HRZ to determine if CWD has already spread beyond an EZ and, if so, in which direction it may have spread.

In this rule a HRZ would be established around the current affected area in southwestern Wisconsin. This HRZ would extend approximately 40 miles out from the current known positives. Based on disease prevelence, deer dispersal and the possibility of several dispersal events occuring since CWD has been in the state, the 40-mile radius was established. Following statewide surveillance, the radius of the current HRZ or future HRZs may be modified in response to this new information regarding presence of the disease and reseach findings regarding deer dispersal. It is likely that reducing the size of the current HRZ would reduce its effectiveness in minimizing the risk of disease spread from the current EZ. Maximum dispersal distances reported in four southern Wisconsin studies were 12 miles or less. Much longer dispersal movements (greater than 100 miles), however, have been observed in the Midwest. Therefore, it is possible that dispersing affected deer could move through the smaller buffer area and establish new areas outside of a HRZ. If these new areas were in an area with 20-30 deer per square mile of deer habitat, CWD may spread more rapidly and be more difficult to control.

Intensive surveillance for CWD would be conducted in a HRZ to determine if CWD may have already spread from the associated EZ and, if so, to determine the distribution, prevalence, and direction of spread. Because a HRZ is most at risk of infection due to its proximity to an EZ, a higher level of surveillance testing is proposed for a HRZ than for the rest of the state. A goal of testing 500 deer/deer management unit was set for fall 2002, for a total of 7,000 deer. Plans for future surveillance would depend on the results of the fall 2002 testing, but it is likely that intensive surveillance in a HRZ would need to continue for several years until there is a better understanding of the distribution and dynamics of CWD in Wisconsin.

The length of time that an area would need to be in a HRZ would depend on the results of surveillance testing within the zone and progress in depopulation within the associated EZ.

Effects.

Deer Population. The specific effects on deer population size of an HRZ would depend on the actual boundaries of the zone that would be delineated in annual rules. Deer population goals within the state range from 10 – 30 deer/ mi^2. Depending on the location of a HRZ, the change in deer population goals could range from no change to a reduction of 67%. The proposed density goal of 10 deer per square mile of deer habitat (approximately four deer per square mile land area) is comparable to the deer density in the CWD endemic area of Colorado (approximately 5 -6 deer per square mile of land area; Vieira 2001, Vieira and George 2001).

Since a majority of deer management units are above population goals, the actual number of deer that need to be removed is significantly more than the goal would predict. For example, the CWD Management Zone created by emergency rule in 2002 had an estimated population of approximately 60,000 deer, as opposed to 50,000 deer if the units were at goal. To reach the overwinter density goal of 10 deer per square mile of deer habitat there would be 22,000 deer in this zone. Therefore, approximatley 38,000 deer, or 63% of the current deer population, would need to be removed. Whereas only 28,000 deer, or 56% of the current deer population, would need to be removed if these units were at goal.

Disease Control. The deer population reduction planned for a HRZ is designed to reduce the risk that CWD would spread from an EZ. However, it is difficult to predict the consequences of the proposed density reduction on disease spread because there remains uncertainty about the mechanism of transmission and the effect of host density on transmission. If CWD transmission rates are density-dependent, then the reduction in the deer population of a HRZ could be expected to reduce the rate of spread should new affected areas become established by deer dispersing from an EZ. This would allow time for new disease areas to be discovered through the intense surveillance that would be conducted in a HRZ. The proposed post-hunt density for a HRZ is similar to the deer density in Colorado's endemic area where CWD has persisted with slow increases in prevalence (Miller *et al.* 2000).

The reductions of deer populations in a HRZ are designed to limit ingress of deer into the associated EZ, thereby facilitating the eradication of CWD from the affected area. However, successful herd reduction would ultimately depend on hunter participation and willingness to shoot more deer than ever before. This may be difficult for hunters when they may not desire additional venison.

Ecological Effects. The specific ecological effects of reduced deer population size in a HRZ would vary depending on the location of the zone. Currently, the CWD Management Zone defined by the 2002 emergency rule covers much of southwestern Wisconsin. If CWD is confined to this region, the ecological effects of reduced deer density would likely be more limited than if a broader HRZ is defined in response to the discovery of CWD in other regions of the state.

In 1995, the DNR prepared an environmental assessment on deer population goals and harvest management (Vander Zouwen and Warnke 1995). The environmental assessment focused on effects of alternative overwinter deer population goals and deer management unit boundaries. The assessment described known or potential ecological effects of various deer population densities. These potential effects are discussed in detail in the Depopulation section and are briefly summarized below.

The deer population environmental assessment concluded that different deer population densities cause different effects on other members of the communities they live in. These effects differ depending on the community type and the region of the state along with habitat carrying capacity and the severity of winter weather. Although research linking known deer population densities to specific effects on natural communities is limited, a number of probable effects of lower deer population densities can be suggested. Low deer densities can affect plant community composition. These changes may be more pronounced with deer population densities below 20-25 deer per square mile of deer habitat. Favored plant species may increase and less palatable plant species may decrease in abundance. The resulting changes in plant species composition can affect other taxa, ecological function, and productivity of an ecosystem (Bartelt and Mladenoff 1995). Many herbaceous plants can benefit from low numbers of deer (Martin 1995). Damage to plants takes the form of lost foliage, reduced reproduction, and reduced energy reserves. Tree and shrub species consumed by deer are likely to increase when overwinter deer population densities are reduced below 15-20 deer per square mile of deer habitat (Mladenoff 1995). Low levels of deer browsing on some plant species, for which some invertebrates have obligatory relationships, may affect these host-specific invertebrates (Henderson 1995). Small mammal species can benefit from low deer populations through changes in habitat structure (Edwards 1995). Low deer population densities can benefit some bird species due to changes in habitat structure, particularly the abundance of shrubs and some herbaceous plants, as well as long-term effects on forest species composition and canopy (Hoffman 1995). Bird species most likely benefiting from low deer densities are shrub-nesting species. In addition, it is not expected that turkeys would be affected from a decrease in deer densities.

The deer population reductions proposed for a HRZ likely would reduce many of the adverse ecological effects that high deer densities may have caused during recent years. However, it is uncertain how landowners and hunters would react to the proposed population reductions, especially considering the public concerns about the potential human health risks associated with consuming venison from deer that may be infected with CWD. If a large proportion of hunters decide not to hunt in the future because of human health concerns, deer harvests in the region may actually decline resulting in further growth of the deer population and subsequent greater adverse impacts on regional plant communities and dependent animal species.

The gray wolf is the only large carnivore in Wisconsin that is heavily dependent on deer as a food source. The Wisconsin DNR reclassified wolves from endangered to threatened in 1999. The U. S. Fish and Wildlife Service started the process to reclassify in 2000 and should complete the process in 2003. The current CWD management zones are in Wolf Management Zone 4. This zone includes 28 counties in southern and eastern Wisconsin that appear to have limited potential for wolves. Currently no wolf packs are known to occur in this zone and no wolf depredations have occurred in the zone (Wydeven and Wiedenhoeft 2002). During July 2001-June 2002, wolf observations were reported from seven counties in the zone but these may include misidentifications. An adult male wolf was killed by a vehicle on the west side of Madison in April 2002. The presence of this wolf, however, is not likely indicative of a resident population. Because the area included in the current CWD management zone is outside of the northern and central forest wolf range, the proposed deer population reductions are not expected to have an impact on the recovery of Wisconsin's wolf population. However, if a substantially larger HRZ were to be created in response to a wider distribution of CWD in the state, it is possible that wolf recovery could be adversely affected.

Several other carnivore and omnivore species including black bear, coyote, and bobcat prey on deer fawns when available. In addition, several species of birds use road-killed deer as a source of carrion. These include common raven, American crow, turkey vulture, and the bald eagle. These species are generalists and would not be expected to be greatly affected by changing deer densities.

Wisconsin has one wild elk herd that is located near Clam Lake in the northwestern part of the state. This herd was established in 1995 when 25 animals were transplanted from Michigan. The population has grown to an estimated 120 animals during the past seven years. The Natural Resources Board has approved establishment of a second wild elk herd in Jackson County. This project is currently on hold to await completion of CWD surveillance within the central forest region. The Jackson County introduction would need to meet all applicable regulations regarding the importation of cervids into Wisconsin, as well as all health testing and monitoring requirements.

Because elk are susceptible to CWD, the presence of CWD in Wisconsin poses a threat to their restoration in the state. Both the existing Clam Lake elk population and the proposed Jackson County population are outside of the current CWD management zone. If CWD occurs across a broader area it could potentially threaten the proposed Jackson County elk population and the Clam Lake herd. In the event that CWD is discovered in northwestern Wisconsin and a deer HRZ is defined that includes the Clam Lake elk population, the reduced deer densities could potentially reduce interspecific competition with elk. Such competition would likely be limited to severe winters when both elk and deer may occupy conifer yards.

Socio-economic Effects. The socio-economic effects of various deer population goals were analyzed in the environmental assessment on deer population goals and harvest management (Vander Zouwen and Warnke 1995). Socio-economic effects of deer herd reduction are discussed in detail below.

The deer herd reduction proposed for a HRZ would likely result in short-term loss of hunting recreation, hunting associated industries, and wildlife viewing opportunities. Research to address some of these issues is currently being conducted which should provide information on hunter behavior and attitudes. Deer population reductions can be expected to result in less damage to agricultural crops and timber resources and fewer deer-vehicle accidents. These impacts would be expected to last for the duration of disease control efforts and subsequent repopulation of the area.

The Wisconsin Chippewa tribes are entitled to harvest up to 50% of deer available for harvest in deer management units that fall within the ceded territories. None of the ceded territory falls in the southern portion of the state where the current HRZ is located. Tribal deer harvest occurs primarily in the northern deer management units, while limited harvest occurs in all other portions of the state except the south. If CWD is discovered in the ceded territories and a HRZ is established, the deer herd reduction could have an impact on the Chippewa tribes and the overall tribal deer harvest, depending on the extent and location of the disease. Management of the deer herd at 10 deer per square mile in a HRZ may impact tribal customs, venison availability, and recreational opportunities. These impacts, however, would be less than those experienced in an EZ where the goal is depopulation.

Deer and deer hunting are integral parts of Wisconsin's socio-economic fabric. Nearly 700,000 hunters pursue white-tailed deer on opening day of the traditional 9-day gun deer season. During the past decade, hunters have harvested an average of more than 400,000 deer a year. An estimated seven million hunter-days of recreation are provided annually during the archery and gun hunting seasons. Economically, deer hunting supports thousands of jobs in Wisconsin and it is estimated that it contributes close to $1 billion to the state's economy (IAFWA 1997). An estimated 2.3 million state residents observed, fed, or photographed wildlife during 1996 and deer were among the most popular species for wildlife viewing. It is anticipated that the increased hunting opportunities in a HRZ would result in an intial period of increased hunter participation, followed by a decline in hunter numbers and effort as the deer population decreases. Hunter numbers and hunting opportunities would be expected to be low for the duration of the disease control effort and increase with subsequent repopulation of the area by deer.

Changes in property values are another possible effect of deer herd reduction in a HRZ. Whether this effect would be a positive or negative change in a property's value may be largely dependent on the type of land, land use, and the motivation of the parties involved. The magnitude of any effect would likely depend on the extent and location of an HRZ and the types of property involved (*e.g.,* recreational, agricultural, or rural/urban). However, any effect on property values in a HRZ would likely be less than those experienced in an EZ where the goal is depopulation.

High deer densities can result in significant damage to agricultural crops. An additional benefit of a reduction of deer would likely be a reduction of agricultural deer damage in a HRZ for the period of time that the deer population in a HRZ is reduced. The extent of this benefit would depend on the exent and location of a HRZ in relation to the types of crops and the amount of agriculture in the area. As the deer density in a HRZ is restored, deer agricultural damage would likely increase. Appendix G presents a discussion of current deer crop damage.

High deer densities may result in damage to the forest products industry. High deer densities are a concern of county foresters and industrial forest landowners, especially when deer populations exceeded 20-25 deer per square mile of habitat (Zastrow 1995). An additional benefit of a reduced deer herd would likely be a reduction in forest deer damage in a HRZ for the period of time that the deer population was reduced. The extent of this benefit would depend on the exent and location of a HRZ in relation to the forest types and the acreage of forests in the area. As the deer herd in a HRZ is restored, deer forest deer damage would likely increase. Appendix H presents a discussion of the economic impacts of deer on forests.

Deer-vehicle accidents are a significant problem in Wisconsin. The number of accidents is related to both the number of miles driven by motorists and the number of deer. In some counties, deer collisions are one of the most prevalent causes of vehicle accidents, accounting for up 64% of all vehicle accidents (average of 16%). Deer collisions account for over 30% of vehicle crashes in twenty counties. In 2001, there were 801 people injured and nine killed in deer-vehicle collisions. It has been estimated that there have been over 40,000 deer-vehicle collisions each of the last several years in Wisconsin. Annual vehicle repair costs total approximately $100 million. Appendix I presents a discussion of deer-vehicle accidents. An additional benefit of a reduction of deer would likely be a reduction of deer-vehicle collisions in a HRZ for the period of time that the deer population in a HRZ is reduced. The extent of this benefit would depend on the exent and location of a HRZ in relation to the miles of major roads and the human population in the area. As the deer herd in a HRZ is restored, deer-vehicle collisions would likely increase.

Currently there is no evidence that CWD can be transmitted to humans or livestock (see Susceptibility in the Background section). No cases of human prion disease have been associated with CWD (Williams *et al.* 2002a). In 2002, a report surfaced regarding three patients from northwest Wisconsin who died of neural disorders and who reportedly consumed venison. Upon investigation of this report by the Centers for Disease Control, no association with CWD was found (DHFS 2002). However, because CWD is a TSE and the transmission of BSE to people in England, there remains concern about the perceived risk of CWD transmission to humans and cattle. The deer reduction planned for a HRZ is believed to be the most effective strategy for preventing the spread of CWD across the state and minimizing any potential risk for humans and livestock.

The rapid population reduction planned for a HRZ would require changes to deer herd monitoring procedures because the traditional sex-age-kill method is dependent on fairly stable hunting season frameworks and harvest rates. Deer populations in a HRZ would be monitored using a combination of helicopter or fixed-wing aerial surveys and population modeling.

The tradition of hunting, which is one of the cornerstones of the state's outdoor recreational heritage, would likely also be affected by deer herd reduction. For over a century, deer hunting has taken place in northern and central Wisconsin, and since the mid-1900's, in southern Wisconsin. The effect of deer herd reduction on this fall activity is difficult to measure, but the effect on a tradition that is so deeply ingrained in a human culture cannot be overlooked. On opening day of the traditional 9-day gun deer season, over 700,000 hunters pursue white-tailed deer. For these hunters hunting is an opportunity for camaraderie, recreation, food, and to take part in a tradition handed down from one generation to another. However, herd reduction creates problems for these hunters. First, these hunters are now being asked to assist with the population reduction of the animal that is the source of their tradition. Secondly, hunters are being asked to harvest more deer than they can use. Herd reduction, while crucial for the containing the disease, remains a personal dilema for hunters and resource managers.

These effects would be expected to last for the duration of disease control efforts and subsequent repopulation of the area. Because the deer population reduction proposed for a HRZ is less than for an EZ, the magnitude of the socio-economic effects would likely be less than those described in the Depopulation section.

Analysis of Alternatives to Herd Reduction.

No Action. Under this alternative no effort would be made to reduce the deer population below current goal levels (10 to 30 deer per square mile of deer habitat) in the area surrounding an EZ. Hunting season frameworks would not change. Zone T season structures could be used in selected deer management units if overwinter populations were above 20% of goal and a regular nine-day gun season was determined to be insufficient to reduce the deer herd. Surveillance testing would be conducted at the same level of intensity as in the rest of the state, approximately 500 deer tested/county.

The deer population goals in most of the state are greater than those in Colorado's endemic area. These higher deer densities may facilitate more rapid spread of CWD than has occurred in Colorado making it more difficult to contain and eradicate the disease should deer dispersing from an EZ establish new disease areas outside an EZ. Higher deer densities in the area surrounding an EZ would likely also result in immigration into an EZ making it more difficult to eradicate CWD from the affected area.

The CWD surveillance-sampling goal of 500 deer per county is designed to be able to detect a CWD positive deer with 99% certainty if prevalence in the management zone or county is as low as one percent. However, this level of testing around an EZ may not be as efficient as the proposed actionthat is designed to detect new disease areas in the earliest stage when it would be easiest to control the disease.

Under the no action alternative, deer populations throughout southwestern Wisconsin would be managed for the current population goals. Current deer population goals represent an attempt to balance public demands for the positive benefits of deer (consumptive and non-consumptive) with the public's willingness to accept the economic and ecological effects of deer. Maintaining deer populations at the established goals during the next few years can be expected to meet the public's demand for deer hunting, recreation, and wildlife viewing opportunities, and tribal harvest allocations, but would likely maintain current levels of negative impact on plant and animal communities, deer damage to agricultural crops, and high numbers of deer-vehicle accidents.

It is difficult to predict the long-term consequences of failing to contain and control CWD in Wisconsin given current knowledge of this disease. However, it would likely have serious long-term ecological and socio-economic consequences. Initially, public concerns about the safety of venison consumption may reduce hunter pressure and harvests in the CWD affected area resulting in substantial growth of the local deer population. The resulting browsing pressure may adversely impact the local natural plant community and animal species that are dependent on native plants. Higher deer populations could also increase the rate of CWD transmission making it more difficult to control the disease. Failure to control CWD could

eventually lead to the collapse of the local deer population and the spread of the disease to other regions within Wisconsin and surrounding states. This eventual collapse of the deer herd would likely result in ecological and socio-economic effects similar to those experienced under the proposed action. High levels of environmental contamination could preclude the repopulation of deer in the affected areas. Widespread declines in the deer population would likely have major impact on deer hunters and wildlife watchers along with wildlife dependent businesses. The spread of CWD throughout Wisconsin's wild deer population could increase the risk to farmed cervids and potentially the risk of transmission to cattle and humans.

Spread of CWD throughout the state could place Wisconsin's newly restored elk population at risk. The potential decline of the Central and Northern Forest deer populations could adversely impact gray wolves.

If CWD is discovered in the ceded territories and the deer herd collapses, there would be little possibility for repopulation of the herd. This would have long-term impacts on the Chippewa tribes and the overall tribal deer harvest. The deer herd collapse would impact tribal customs, venison availability, and recreational opportunities.

Because hunting season frameworks would not be altered under this alternative, the traditional sex-age-kill method could continue to be used to monitor changes in deer population size.

Intensive Surveillance. Under this alternative, no effort would be made to reduce the deer population in the area surrounding an EZ until intensive surveillance was conducted. The intensity of sampling for CWD surveillance under this alternative would be the same as the proposed action - testing 500 deer/deer management unit. Therefore, it is possible that several years may elapse before new disease areas are discovered and any action is taken to contain the disease. Hunting season frameworks would not change.

Because deer population goals in a majority of the state are greater than in Colorado's endemic area, CWD may spread more rapidly than in Colorado. Rapid spread from a newly affected area would substantially increase the difficulty of containing and eradicating the disease from new disease areas.

Maintaining higher deer densities in the area surrounding an EZ would likely result in immigration of deer into the EZ making it more difficult to eradicate CWD from the affected area.

Deer population goals would not change under this alternative so the short-term ecological and socio-economic effects of deer population changes would be similar to the no action alternative. The more intensive surveillance would likely increase the liklihood of detecting new affected areas. With the establishment of new EZs, the risk of rapid CWD spread from new affected areas would be decreased. Therefore, the risk of significant long-term adverse ecological and socio-economic effects would likely be less than under the no action alternative, but greater than under the proposed action.

Herd Reduction Tools.

The following sections provide an assessment of the proposed tools to accomplish herd reduction in a HRZ and an assessment of alternative tools considered.

Proposed Actions.

A combination of tools would be necessary to achieve herd reduction. No one tool is expected to achieve herd reduction by itself. The proposed rule specifies Special Disease Control Hunts for the archery and gun seasons in the deer management units or portions of units included in a HRZ. The rule would also create special CWD deer permits that authorize the harvesting of deer within a HRZ. The rule further requires that any deer harvested in a HRZ must be registered at a deer registration station designated by the DNR within a HRZ no later than 5:00 p.m. on the day after it was killed. However, deer may be transported outside of a HRZ prior to registration as long as they are registered within an HRZ by 5:00 p.m. the day after kill.

Extended Season. A HRZ gun season would run for four days concurrent with Zone T in late October (a proven herd reduction hunt) and from the Saturday prior to Thanksgiving through January 3 (when many are on vacation and available to hunt). A HRZ archery season would run from the Saturday nearest September 15 through January 3.

Unlimited Tags. The rule proposes that hunters not be limited on the number of "earn-a-buck" tags they can acquire. By policy, the DNR has limited tag issuance to four tags per hunter per day. These tags can be used on antlerless deer in an IHZ and HRZ. They can also be used on bucks if an antlerless deer is shot and tagged first and the antlerless deer is transported along with the buck to the registration station. Tags issued with the archery and gun deer licenses and Zone T antlerless deer tags can be used in the same manner as the "earn-a-buck tags". Offering unlimited and free tags is expected to increase harvest of deer. Hunters have suggested that free tags would increase their willingness to harvest deer.

Earn-a-Buck Regulation. The rule proposes an earn-a-buck regulation (*i.e.* antlerless deer must be tagged by a hunter before that hunter can shoot an antlered buck in a HRZ). This rule applies to archery hunting, gun hunting, and muzzleloader hunting. Hunters can earn buck tags with antlerless deer killed in the archery season and gun deer season, as well as, those killed under authority of an agricultural damage shooting permit. There is no limit to the number of bucks that may be killed by a hunter. Buck tags can be used during all archery and gun seasons in a HRZ. Hunters without a buck tag can harvest a buck if they first harvest an antlerless deer and the antlerless deer is transported along with the buck to the registration station. In this case, a Zone T tag, license carcass tag, or earn-a-buck tag can be placed on the buck.

Modification of Herd Reduction Zone Hunting Regulations. HRZs would change from long hunting seasons and earn-a-buck regulations to standard seasons and regulations in a deer management unit within a HRZ when the deer herd in that unit is reduced to 15 deer per square mile of deer habitat. Standard and Zone T seasons and regulations would then be used to keep the deer population near the goal of 10 deer per square mile.

State Park and Refuge Seasons. For most parks in a HRZ, the season is proposed to run from the Saturday prior to Thanksgiving to the third Sunday following Thanksgiving. In addition, there would be a four-day October season that would run concurrent with the Zone T dates, with hunting hours closing at noon each day. Parks in urban areas and parks that primarily consist of designated use areas would not have hunting seasons. Government shooters would be used instead. Park archery seasons in a HRZ would run concurrent with gun seasons and extend to January 3 only in those parks which have had late archery seasons. Waterfowl refuges in a HRZ would be open to deer hunting during the gun and archery seasons. Opening of state parks and waterfowl refuges to deer hunting is expected to increase deer harvest and prevent refuge situations where deer and CWD would otherwise be protected.

Effects.

Deer Herd Reduction and Hunter Behavior. Public hunting is believed to be the most effective method of herd reduction due to the large number of hunters and their access to both public and private lands in a HRZ. The long seasons are offered to give hunters every chance to reduce the deer herd quickly to the lower goal. In a HRZ, the gun season is substantially longer than the current nine-day gun season, but there are fewer season days in November. The season ends earlier than in an IHZ to give consideration for landowners and other recreationists as the herd density goals are higher in a HRZ.

The earn-a-buck regulation is believed to be the most effective regulation for herd reduction (Wisconsin DNR, unpubl. data). It allows those who are willing to shoot both bucks and antlerless deer to continue to do so. But, most importantly, it requires those who prefer to shoot only bucks to shoot antlerless deer as well.

The actual percentage harvest increase, and therefore success in meeting CWD control goals, is impossible to predict as none of these regulations have been used before in the same way or in a CWD situation in Wisconsin. Although all of these regulations have the potential to result in successful herd reduction, success would ultimately depend on hunter participation and willingness to shoot more deer than they ever have before, when they may not want the meat.

Public Safety. Some landowners and recreationists have expressed concern about safety for themselves, their family, their livestock and their pets during the long gun season. Having more than a one month gun season logically adds risk to that provided by a nine-day gun season. The degree of added risk is impossible to predict. However, there would be much lower densities of deer hunters in the woods on any given day than during the intense nine-day gun season. Also, landowners have control over who hunts on their land and can limit the dates and times that hunters are present. Most hunting accidents involve self-inflicted injuries or hunters accidentally shooting their partners (T. Lawhern, pers. comm.). It is an extremely rare event for non-hunters, livestock, or pets to be shot by a deer hunter, even when there are over 600,000 hunters in the woods on the traditional opening weekend. The late October Zone T season has been used annually as a herd management tool from 1996 to present without hunters shooting other hunters or non-hunters. The first four days of the 2002 CWD hunt in the current IHZ and CWD Management Zone resulted in no fatal hunting accidents.

Trespass. Hunters are still required to get permission from landowners to hunt on their lands in the CWD zones. Trespass laws still apply. It is possible that some hunters would perceive the mission of CWD as over-riding this law and rationalize trespass. On the other hand, many would not see deer in this area as valuable as in the past and may choose not to risk trespassing. During the 2002 hunts in the current IHZ, there were fewer instances of trespass in Iowa County and no increase in trespass complaints in Dane County compared to previous years (Dane and Iowa County Sheriff Departments, pers. comm.). It is anticipated that the remaining counties in the current CWD management zone had similar experiences.

Recreational and Land Use Conflict. There is the potential for many recreational conflicts to be caused by the proposed hunting regulations. Hunters that normally are not required to wear blaze orange would be required to during the longer gun deer season. Some hunters may decide not to hunt with a dog for fear of another hunter mistaking their dog for a deer. Waterfowl hunters would not be required to wear blaze orange, but they may choose not to hunt because of concern for not being seen by a gun deer hunter. Muzzeloaders would not have their own season separate from the gun season. Hikers, bicyclists, and skiers may choose not to recreate in the longer gun season because of concerns for safety. Snowmobilers may have trouble getting access for trail maintenance before the ground is frozen, and they may not be able to open trails, as some landowners may wish to prohibit snowmobiling while a deer season is open. Some local residents may choose not to take walks on their lands or on area roads due to safety concerns. Some people may choose not to use parks in a HRZ while the gun seasons are in place. Landowners may grow weary of hunters asking permission to hunt on their lands or of trying to manage potential conflicts between hunters and their farm operations. Hunters may be more likely to damage some standing crops which have not yet been harvested during the early part of the hunting season. Landowners may perceive the need to keep livestock off their pastures for longer periods of time to ensure their safety. However, considering the low densities of hunters that are predicted to be in the woods at any one time over the course of the season, many who initially think they would not recreate or use their lands in certain ways may choose to do so. It is not known to what degree recreational and land use conflicts would develop and how many people would be affected. A HRZ gun season is proposed to be substantially shorter than an IHZ season in consideration of these recreational conflicts and the lesser need for herd reduction.

Enforcement. The regulations proposed in this rule are enforceable based on past experience. However, the longer seasons and complexity of regulations in a HRZ would place a significantly greater workload on enforcement personnel through responding to questions and tips and field checks of hunters.

DNR Revenue. HRZ hunters would not need to pay for hunters choice and bonus permit applications, but the $3 fee does not provide much revenue beyond the cost of processing the permits. In addition, IHZ hunters would receive free permits, so they would not need to purchase bonus tags to harvest additional antlerless deer. Bonus tag revenue would decline for the affected deer management units (Appendix E). Bonus tag revenue is ear-marked for the Wildlife Damage Abatement and Claims Program. It is possible, however, that revenue would not be sufficient to pay for abatement and compensation as a result. With a greatly reduced deer herd in a HRZ and IHZ, damage claims may also decrease substantially.

DNR Staffing and Expenditures. The free tags, earn-a-buck rule, and longer seasons would produce more deer to be registered in the short-term and therefore higher costs as registration stations are paid $0.35 per deer registered. However, once the population goals are neared or reached, annual harvests

and registrations would decrease, as would registration fee costs. Customer service, wildlife management, licensing, and law enforcement staff would have to spend more of their time answering questions or giving presentations to groups on the new hunting regulations.

Local Commerce. It is unknown to what degree this rule would impact local economies in a HRZ. Hunting and other types of outdoor recreation contribute significantly to local economies (Vander Zouwen 1998). Lengthened hunting seasons may result in increased expenditures in local communities if hunter numbers remain unchanged or increase and hunters increase their number of days in the field. On the other hand, other types of recreation and associated expenditures may decrease if recreationists do not spend time outdoors in a HRZ due to concerns about safety or other conflicts with deer hunting.

Analysis of Alternative Herd Reduction Techniques.

Traditional Seasons or Modest Season Extension. Traditional seasons have not kept deer populations at established overwinter population goals in many units during most years in the last decade (R. Rolley, pers. comm.). Traditional seasons, even with October and December Zone T seasons, would certainly not encourage or allow adequate harvest to meet CWD control goals in a HRZ (approximately 50% herd reduction goal). Similarly, a somewhat longer season is not expected to generate enough harvest. It is believed that hunting through the Christmas holiday week when many are on vacation is needed to generate the harvest necessary for a HRZ. However, a shorter season would be less costly to administer and enforce and result in less recreational and land use conflicts.

Unlimited Either-Sex Tags. The unlimited either-sex deer hunting regulation was the most preferred alternative of respondents to a questionnaire on CWD control options distributed at public meetings in May 2002 (Appendix D). This regulation would be the easiest to administer by DNR staff, license vendors, and registration stations. It would be the easiest regulation to enforce and it would be the easiest regulation for hunters to understand. It would also intuitively be the regulation of choice because all deer seen by hunters could be shot without passing up any bucks and without limit. However, the DNR believes that the earn-a-buck regulation would likely result in more deer being harvested by the end of the season, which is the most important performance measure for any regulation in control of CWD. With hunter perceptions of the safety of venison, it is expected that many hunters would only shoot bucks and pass on does and fawns, particularly if they had not accepted the herd reduction goal. An earn-a-buck regulation ensures that a doe or fawn is shot for each buck harvested, which would not likely occur in an unlimited either-sex hunting regulation.

Earn-a-buck with Multiple Antlerless Deer. Some hunters and landowners in focus groups conducted in the current EZ during April 2002 suggested that hunters be required to shoot two or more antlerless deer for each buck they shoot (J. Petchenik, unpubl. data.). The obvious goal is to reduce the herd as quickly as possible, with the reasoning that hunters would shoot two antlerless deer to shoot their buck. This alternative was considered by the DNR both for the 1996 earn-a-buck regulation and the CWD control regulation. It was not adopted because the DNR believes that shooting two antlerless deer per buck would likely be perceived by hunters as too much of an obstacle, causing them to give up hunting or hunt elsewhere. This regulation would also likely reduce buck harvest, and buck harvest is particularly important due to the greater dispersal tendency of young bucks. This regulation would also be more difficult to administer due to the required record keeping on numbers of antlerless deer shot by each hunter.